# **National Centre for Radio Astrophysics**



Internal Technical Report GMRT/RFI/1 – 27<sup>th</sup> October 2020

## **Report on RFI measurement of Coral make IP phone**

Shri. Sureshkumar, Shri. Pravin Raybole, Shri. Ankur, Shri. Shrikant Bhujbal, Lalit Chaudhari

skumar@gmrt.ncra.tifr.res.in, pravin@gmrt.ncra.tifr.res.in

Revision	Date	Modification/ Change
Ver. 1	27 <sup>th</sup> October. 2020	First Version

#### **Objective:**

To find out radio frequency interference coming from the Coral make IP phone.

#### (Model No. IP2LP)

### Key Features:

- ➢ HD Voice
- Support PoE
- Supports Two SIP Accounts
- Support 3 way Conference
- >  $132 \times 64$  pixel 2.3 inch Graphical LCD
- Fully Compatible with Asterisk, BroadSoft Platform

#### **Specifications:**

2 Lines (Support 2 SIP account)     Support Call Waiting, Call Forward, Call Transfer       Call on Hold, Mute, Auto-answer, Redial, DND     Local 3-Way (Conference       XML Browser     Direct IP call       Phonebook (500 entries), Call logs (100 entries)     Volume Adjustable, Ring tones Selectable       DSPG Chipset     8M Bytes Flash Memory       AC Power Adapter: Input: AC 100-240V; Output: DC     5V/1A       31 Keys (with 4 Soft Keys, 10 Programmable keys)     5V/1A       1 Voice Mail Light     2 RJ45 10/100 Ethernet Ports       1 Voice Mail Light     2 RJ45 10/100 Ethernet Ports       1 Voice: HD Handset, HD Speaker     Wideband Codec: G.722       Narrowband Codec: FCMA, PCMU, G.729, G723_53,     VAD, CNG , Echo Canceller       PLC, AJB, AGC     Full-Duplex Hands-free Speakerphone with AEC       PLC, AJB, AGC     Full-Duplex Hands-free Speakerphone with AEC       BLF(Busy Lamp Field)     Call Pickup, Group Call Pickup       Hot Desking     Call Recording       Auto provisioning using FTP/TFTP/HTTP/HTTPS/PNP     Dial through IP PBX Using Phone Number       Configuration Managements with Web, Keypad on the phone, and Auto Provisioning     SNMP       SIP V1(RFC2543), V2(RFC3261)     Fully Compatible with Asterisk, BroadSoft Platform       QOS     ILDP	Phone Features				
XML BrowserDirect IP callPhonebook (500 entries), Call logs (100 entries)Volume Adjustable, Ring tones SelectablePhysical FeaturesDSPG Chipset& M Bytes Flash MemoryAC Power Adapter: Input: AC 100-240V; Output: DC31 Keys (with 4 Soft Keys, 10 Programmable keys)2 RJ45 10/100 Ethernet Ports1 Voice Mail Light2 RJ45 10/100 Ethernet Ports1 Voice Mail Light2 RJ45 10/100 Ethernet PortsPoE: IEEE 802.3a1*RJ9(4P4C) Handset Port and 1*1*RJ9(4P4C)PoE: IEEE 802.3aHeadset PortMulto FeaturesWideband Codec: G.722Marrowband Codec: PCMA, PCMU, G.729, G723_53, G723_63,G726_32VAD, CNG , Echo CancellerPLC, AJB, AGCFull-Duplex Hands-free Speakerphone with AECPHST FeaturesSMS, MWIMusic on hold, IntercomMusic on hold, IntercomBLF(Busy Lamp Field)Call Pickup, Group Call PickupCharl DeskingCall RecordingAuto provisioning using FTP/TFTP/HTTP/HTTPS/PNPDial through IP PBX Using Phone NumberConfiguration Managements with Web, Keypad on the phone, and Auto ProvisioningSNMPSIP V1(RFC2543), V2(RFC3261)Fully Compatible with Asterisk, BroadSoft PlatformQOSLLDPLLDPNAT Transverse: STUN ModeNTTP/HTTPS Web Server for ManagementProxy Mode and Peer-to-peer SIP Link ModeNTP for Auto Time SettingUDP/TCP/DNS-SRV(RFC 3263)TFTP/FTP/HTTP/HTTPS ProtocolsSupport HTTPS (SSL)Support SRTP for Voice Data EncryptionSupport Login for AdministrationOpenVPN, IEEE802.1X	2 Lines (Support 2 SIP account)	Support Call Waiting, Call Forward, Call Transfer			
Phonebook (500 entries), Call logs (100 entries)       Volume Adjustable, Ring tones Selectable         Physical Features       SM Bytes Flash Memory         AC Power Adapter: Input: AC 100-240V; Output: DC 5V/1A       AC Power Adapter: Input: AC 100-240V; Output: DC 5V/1A         31 Keys (with 4 Soft Keys, 10 Programmable keys)       2 RJ45 10/100 Ethernet Ports         1 Voice Mail Light       2 RJ45 10/100 Ethernet Ports         1 Voice Mail Light       2 RJ45 10/100 Ethernet Ports         PoE: IEEE 802.3a       1*RJ9(4P4C) Handset Port         Mudio Features       1*RJ9(4P4C)         Marowband Codec: FCMA, PCMU, G.729, G723_53, G723_63, G726_32       VAD, CNG , Echo Canceller         PLC, AJB, AGC       Full-Duplex Hands-free Speakerphone with AEC         IP-PBX Features       IP-PBX Features         SMS, MWI       Music on hold, Intercom         BLF(Busy Lamp Field)       Call Pickup, Group Call Pickup         Call Completion       Anonymous Call, Anonymous Call Rejection         Auto provisioning using FTP/TFTP/HTTP/HTTPS/PnP       Dial through IP PBX Using URL Address         SIP V1(RFC2543), V2(RFC3261)       Fully Compatible with Asterisk, BroadSoft Platform         QOS       LLDP         NAT Transverse: STUN Mode       Static IP/DHCP for IP configuration, pppoe         3 DTMF modes: In-Band	Call on Hold, Mute, Auto-answer, Redial, DND				
Physical Features         DSPG Chipset       8M Bytes Flash Memory         31 Keys (with 4 Soft Keys, 10 Programmable keys)       AC Power Adapter: Input: AC 100-240V; Output: DC 5V/1A         1 Voice Mail Light       2 RJ45 10/100 Ethernet Ports         1 Voice Mail Light       2 RJ45 10/100 Ethernet Ports         1*RJ9(4P4C) Handset Port and 1*1*RJ9(4P4C)       Headset Port         PoE: IEEE 802.3a       1*RJ9(4P4C) Handset Port and 1*1*RJ9(4P4C)         Holio Features       Wideband Codec: G.722         Narrowband Codec: PCMA, PCMU, G.729, G723_53, G723_63,G726_32       VAD, CNG , Echo Canceller         PLC, AJB, AGC       Full-Duplex Hands-free Speakerphone with AEC         BLF(Busy Lamp Field)       Call Pickup, Group Call Pickup         Moto Desking       Call Pickup, Group Call Pickup         Hot Desking       Call Recording         Call Completion       Anonymous Call, Anonymous Call Rejection         Auto provisioning using FTP/TFTP/HTTP/HTTPS/PnP       Dial through IP PBX Using Phone Number         Configuration Managements with Web, Keypad on the phone, and Auto Provisioning       SNMP         SIP V1(RFC2543), V2(RFC3261)       Fully Compatible with Asterisk, BroadSoft Platform         QOS       LLDP         NAT Transverse: STUN Mode       Static IP/DHCP for IP configuration, pppoe	XML Browser				
DSPG Chipset   8M Bytes Flash Memory     31 Keys (with 4 Soft Keys, 10 Programmable keys)   AC Power Adapter: Input: AC 100-240V; Output: DC 5V/1A     31 Keys (with 4 Soft Keys, 10 Programmable keys)   2 RJ45 10/100 Ethernet Ports     1 Voice Mail Light   2 RJ45 10/100 Ethernet Ports     1 Voice Mail Light   2 RJ45 10/100 Ethernet Ports     1*RJ9(4P4C) Handset Port and 1*1*RJ9(4P4C)   Headset Port     Audio Features   Holdo Echernet Ports     HD Voice: HD Handset, HD Speaker   Wideband Codec: G.722     Narrowband Codec: PCMA, PCMU, G.729, G723_53, G723_63,G726_32   VAD, CNG , Echo Canceller     PLC, AJB, AGC   Full-Duplex Hands-free Speakerphone with AEC     BLF(Busy Lamp Field)   Call Pickup, Group Call Pickup     Hot Desking   Call Recording     Call Completion   Anonymous Call, Anonymous Call Rejection     Auto provisioning using FTP/TFTP/HTTPS/PNP   Dial through IP PBX Using Phone Number     Configuration Managements with Web, Keypad on the phone, and Auto Provisioning   SNMP     SIP V1(RFC2543), V2(RFC3261)   Fully Compatible with Asterisk, BroadSoft Platform     QOS   LLDP     NAT Transverse: STUN Mode   Static IP/DHCP for IP configuration, pppoe     3 DTMF modes: In-Band, RFC2833, SIP INFO   HTTP/HTTP/HTTPS Web Server for Management     Proxy Mode and Peer-to-peer SIP Link Mode   NTP for Auto Time Setting	Phonebook (500 entries), Call logs (100 entries)	Volume Adjustable, Ring tones Selectable			
AC Power Adapter: Input: AC 100-240V; Output: DC       31 Keys (with 4 Soft Keys, 10 Programmable keys)     SV/1A       1 Voice Mail Light     2 RJ45 10/100 Ethernet Ports       1 Voice Mail Light     1*RJ9(4P4C) Handset Port and 1*1*RJ9(4P4C)       PoE: IEEE 802.3a     I*RJ9(4P4C) Handset Port and 1*1*RJ9(4P4C)       HD Voice: HD Handset, HD Speaker     Wideband Codec: G.722       Narrowband Codec: PCMA, PCMU, G.729, G723_53, G723_63,G726_32     VAD, CNG , Echo Canceller       PLC, AJB, AGC     Full-Duplex Hands-free Speakerphone with AEC <b>IP-PBX Features</b> SMS, MWI       BLF(Busy Lamp Field)     Call Pickup, Group Call Pickup       Hot Desking     Call Recording       Call Completion     Anonymous Call, Anonymous Call Rejection       Auto provisioning using FTP/TFTP/HTTP/HTTPS/PP     Dial through IP PBX Using Phone Number       Configuration Managements with Web, Keypad on the phone, and Auto Provisioning     SNMP       SIP V1(RFC2543), V2(RFC3261)     Fully Compatible with Asterisk, BroadSoft Platform       QOS     LLDP       NAT Transverse: STUN Mode     Static IP/DHCP for IP configuration, pppoe       3 DTMF modes: In-Band, RFC2833, SIP INFO     HTTP/HTTPS Web Server for Management       Proxy Mode and Peer-to-peer SIP Link Mode     NTP for Auto Time Setting    <					
31 Keys (with 4 Soft Keys, 10 Programmable keys)     5V/1A       1 Voice Mail Light     2 RJ45 10/100 Ethernet Ports       1*RJ9(4P4C) Handset Port and 1*1*RJ9(4P4C)     1*RJ9(4P4C)       PoE: IEEE 802.3a     1*RJ9(4P4C) Handset Port       Audio Features       HD Voice: HD Handset, HD Speaker     Wideband Codec: G.722       Narrowband Codec: PCMA, PCMU, G.729, G723_53, G723_63,G726_32     VAD, CNG , Echo Canceller       PLC, AJB, AGC     Full-Duplex Hands-free Speakerphone with AEC       IP-PBX Features       SMS, MWI     Music on hold, Intercom       BLF(Busy Lamp Field)     Call Pickup, Group Call Pickup       Hot Desking     Call Recording       Call Completion     Anonymous Call Rejection       Auto provisioning using FTP/TFTP/HTTP/HTTPS/PNP     Dial through IP PBX Using Phone Number       Configuration Managements with Web, Keypad on the phone, and Auto Provisioning     TR069       SIP V1(RFC2543), V2(RFC3261)     Fully Compatible with Asterisk, BroadSoft Platform       QOS     LLDP       NAT Transverse: STUN Mode     Static IP/DHCP for IP configuration, pppoe       3 DTMF modes: In-Band, RFC2833, SIP INFO     HTTP/HTTPS Web Server for Management       Proxy Mode and Peer-to-peer SIP Link Mode     NTP for Auto Time Setting <td>DSPG Chipset</td> <td colspan="2">8M Bytes Flash Memory</td>	DSPG Chipset	8M Bytes Flash Memory			
PoE: IEEE 802.3a     1*RJ9(4P4C) Handset Port and 1*1*RJ9(4P4C) Headset Port       Audio Features     Headset Port       Marrowband Codec: PCMA, PCMU, G.729, G723_53, G723_63,G726_32     Wideband Codec: G.722       Narrowband Codec: PCMA, PCMU, G.729, G723_53, G723_63,G726_32     VAD, CNG, Echo Canceller       PLC, AJB, AGC     Full-Duplex Hands-free Speakerphone with AEC       IP-PBX Features     SMS, MWI       Music on hold, Intercom     Call Pickup, Group Call Pickup       Hot Desking     Call Recording       Call Completion     Anonymous Call, Anonymous Call Rejection       Auto provisioning using FTP/TFTP/HTTP/HTTPS/PnP     Dial through IP PBX Using Phone Number       Configuration Managements with Web, Keypad on the phone, and Auto Provisioning     SNMP       SIP V1(RFC2543), V2(RFC3261)     Fully Compatible with Asterisk, BroadSoft Platform       QOS     LLDP       NAT Transverse: STUN Mode     Static IP/DHCP for IP configuration, pppoe       3 DTMF modes: In-Band, RFC2833, SIP INFO     HTTP/HTTP/HTTPS Web Server for Management       Proxy Mode and Peer-to-peer SIP Link Mode     NTP for Auto Time Setting       UDP/TCP/DNS-SRV(RFC 3263)     TFTP/FTP/HTTP/HTTPS Protocols       Support HTTPS (SSL)     Support SRTP for Voice Data Encryption	31 Keys (with 4 Soft Keys, 10 Programmable keys)				
PoE: IEEE 802.3aHeadset PortAudio FeaturesHD Voice: HD Handset, HD SpeakerWideband Codec: G.722Narrowband Codec: PCMA, PCMU, G.729, G723_53, G723_63,G726_32VAD, CNG , Echo CancellerPLC, AJB, AGCFull-Duplex Hands-free Speakerphone with AECIP-PBX FeaturesSMS, MWIMusic on hold, IntercomBLF(Busy Lamp Field)Call Pickup, Group Call PickupHot DeskingCall RecordingCall CompletionAnonymous Call, Anonymous Call RejectionAdministrationDial through IP PBX Using TP/TFTP/HTTP/HTTPS/PnPDial through IP PBX Using URL Address phone, and Auto ProvisioningSIP V1(RFC2543), V2(RFC3261)Fully Compatible with Asterisk, BroadSoft PlatformQOSLLDPNAT Transverse: STUN ModeStatic IP/DHCP for IP configuration, pppoe3 DTMF modes: In-Band, RFC2833, SIP INFOHTTP/HTTPS Web Server for ManagementProxy Mode and Peer-to-peer SIP Link ModeNTFTP/FTP/HTTP/HTTPS ProtocolsProxy Mode and Peer-to-peer SIP Link ModeNTFTP/FTP/HTTPS ProtocolsProxy Mode and Peer-to-peer SIP Link ModeNTFTP/FTP/HTTPS ProtocolsSupport HTTPS (SSL)Support SRTP for Voice Data EncryptionSupport HTTPS (SSL)Support SRTP for Voice Data Encryption	1 Voice Mail Light	2 RJ45 10/100 Ethernet Ports			
Audio Features       HD Voice: HD Handset, HD Speaker     Wideband Codec: G,722       Narrowband Codec: PCMA, PCMU, G.729, G723_53, G723_63, G723_63, G723_63, C723_63, C723_63, G723_63, G723_64, G723_63, G723_64, G723_63, G723_64, G724_64, G726_64, G726_64, G726_64, G724_64, G724_64, G724_64, G724_64, G724	PoE: IEEE 802.3a				
HD Voice: HD Handset, HD SpeakerWideband Codec: G.722Narrowband Codec: PCMA, PCMU, G.729, G723_53, G723_63,G726_32VAD, CNG , Echo CancellerPLC, AJB, AGCFull-Duplex Hands-free Speakerphone with AECIP-PBX FeaturesSMS, MWIMusic on hold, IntercomBLF(Busy Lamp Field)Call Pickup, Group Call PickupHot DeskingCall RecordingCall CompletionAnonymous Call, Anonymous Call RejectionAuto provisioning using FTP/TFTP/HTTP/HTTPS/PnPDial through IP PBX Using URL AddressSNMPTR069Network FeaturesSIP V1(RFC2543), V2(RFC3261)Fully Compatible with Asterisk, BroadSoft PlatformQOSLLDPNAT Transverse: STUN ModeStatic IP/DHCP for IP configuration, pppoe3 DTMF modes: In-Band, RFC2833, SIP INFOHTTP/HTTPS Web Server for ManagementProxy Mode and Peer-to-peer SIP Link ModeNTP for Auto Time SettingUDP/TCP/DNS-SRV(RFC 3263)TFTP/FTP/HTTP/HTTPS ProtocolsSupport HTTPS (SSL)Support SRTP for Voice Data EncryptionSupport Login for AdministrationOpenVPN, IEEE802.1X					
Narrowband Codec: PCMA, PCMU, G.729, G723_53,     VAD, CNG , Echo Canceller       G723_63,G726_32     VAD, CNG , Echo Canceller       PLC, AJB, AGC     Full-Duplex Hands-free Speakerphone with AEC       IP-PBX Features       SMS, MWI     Music on hold, Intercom       BLF(Busy Lamp Field)     Call Pickup, Group Call Pickup       Hot Desking     Call Recording       Call Completion     Anonymous Call, Anonymous Call Rejection       Auto provisioning using FTP/TFTP/HTTP/HTTPS/PnP     Dial through IP PBX Using URL Address       SNMP     TR069       Network Features     SIP V1(RFC2543), V2(RFC3261)       Fully Compatible with Asterisk, BroadSoft Platform     LLDP       QOS     LLDP       NAT Transverse: STUN Mode     Static IP/DHCP for IP configuration, pppoe       3 DTMF modes: In-Band, RFC2833, SIP INFO     HTTP/HTTPS Web Server for Management       Proxy Mode and Peer-to-peer SIP Link Mode     NTP for Auto Time Setting       UDP/TCP/DNS-SRV(RFC 3263)     TFTP/FTP/HTTP/HTTPS Protocols       Support Login for Administration     OpenVPN, IEEE802.1X					
PLC, AJB, AGCFull-Duplex Hands-free Speakerphone with AECIP-PBX FeaturesSMS, MWIMusic on hold, IntercomBLF(Busy Lamp Field)Call Pickup, Group Call PickupHot DeskingCall RecordingCall CompletionAnonymous Call, Anonymous Call RejectionAdministrationFeaturesAuto provisioning using FTP/TFTP/HTTP/HTTPS/PnPDial through IP PBX Using Phone NumberConfiguration Managements with Web, Keypad on the phone, and Auto ProvisioningConfiguration Managements with Web, Keypad on the phone, and Auto ProvisioningSIP V1(RFC2543), V2(RFC3261)Fully Compatible with Asterisk, BroadSoft Platform QOSLLDPNAT Transverse: STUN ModeStatic IP/DHCP for IP configuration, pppoe3 DTMF modes: In-Band, RFC2833, SIP INFOHTTP/HTTPS Web Server for Management 					
IP-PBX FeaturesSMS, MWIMusic on hold, IntercomBLF(Busy Lamp Field)Call Pickup, Group Call PickupHot DeskingCall RecordingCall CompletionAnonymous Call, Anonymous Call RejectionAdministration FeaturesAdministration FeaturesAuto provisioning using FTP/TFTP/HTTP/HTTPS/PnPDial through IP PBX Using Phone NumberConfiguration Managements with Web, Keypad on the phone, and Auto ProvisioningConfiguration Managements with Web, Keypad on the phone, and Auto ProvisioningSNMPTR069Network FeaturesSIP V1(RFC2543), V2(RFC3261)Fully Compatible with Asterisk, BroadSoft Platform QQSQOSLLDPNAT Transverse: STUN ModeStatic IP/DHCP for IP configuration, pppoe3 DTMF modes: In-Band, RFC2833, SIP INFOHTTP/HTTPS Web Server for Management Proxy Mode and Peer-to-peer SIP Link ModeProxy Mode and Peer-to-peer SIP Link ModeNTP for Auto Time Setting UDP/TCP/DNS-SRV(RFC 3263)UDP/TCP/DNS-SRV(RFC 3263)TFTP/FTP/HTTP/HTTPS ProtocolsSupport HTTPS (SSL)Support SRTP for Voice Data Encryption OpenVPN, IEEE802.1X	G723_63,G726_32	VAD, CNG, Echo Canceller			
SMS, MWIMusic on hold, IntercomBLF(Busy Lamp Field)Call Pickup, Group Call PickupHot DeskingCall RecordingCall CompletionAnonymous Call, Anonymous Call RejectionAdministrationFeaturesAuto provisioning using FTP/TFTP/HTTP/HTTPS/PnPDial through IP PBX Using Phone NumberConfiguration Managements with Web, Keypad on the phone, and Auto ProvisioningConfiguration Managements with Web, Keypad on the phone, and Auto ProvisioningSIP V1(RFC2543), V2(RFC3261)Fully Compatible with Asterisk, BroadSoft Platform QOSQOSLLDPNAT Transverse: STUN ModeStatic IP/DHCP for IP configuration, pppoe3 DTMF modes: In-Band, RFC2833, SIP INFOHTTP/HTTPS Web Server for Management Proxy Mode and Peer-to-peer SIP Link ModeProxy Mode and Peer-to-peer SIP Link ModeNTP for Auto Time Setting TFTP/FTP/HTTPS ProtocolsSupport HTTPS (SSL)Support SRTP for Voice Data Encryption OpenVPN, IEEE802.1X	PLC, AJB, AGC	Full-Duplex Hands-free Speakerphone with AEC			
BLF(Busy Lamp Field)Call Pickup, Group Call PickupHot DeskingCall RecordingCall CompletionAnonymous Call, Anonymous Call RejectionAdministrationFeaturesAuto provisioning using FTP/TFTP/HTTP/HTTPS/PnPDial through IP PBX Using Phone NumberConfiguration Managements with Web, Keypad on the phone, and Auto ProvisioningSNMPSNMPTR069Network FeaturesSIP V1(RFC2543), V2(RFC3261)Fully Compatible with Asterisk, BroadSoft Platform ULDPQOSLLDPNAT Transverse: STUN ModeStatic IP/DHCP for IP configuration, pppoe3 DTMF modes: In-Band, RFC2833, SIP INFOHTTP/HTTPS Web Server for Management NTP for Auto Time Setting UDP/TCP/DNS-SRV(RFC 3263)Proxy Mode and Peer-to-peer SIP Link ModeNTP for Auto Time Setting TFTP/FTP/HTTPS ProtocolsSupport HTTPS (SSL)Support SRTP for Voice Data Encryption OpenVPN, IEEE802.1X	IP-PBX Features				
Hot DeskingCall RecordingCall CompletionAnonymous Call, Anonymous Call RejectionAdministrationFeaturesAuto provisioning using FTP/TFTP/HTTP/HTTPS/PnPDial through IP PBX Using Phone NumberConfiguration Managements with Web, Keypad on the phone, and Auto ProvisioningConfiguration Managements with Web, Keypad on the phone, and Auto ProvisioningSNMPTR069Network FeaturesSIP V1(RFC2543), V2(RFC3261)Fully Compatible with Asterisk, BroadSoft Platform QOSQOSLLDPNAT Transverse: STUN ModeStatic IP/DHCP for IP configuration, pppoe3 DTMF modes: In-Band, RFC2833, SIP INFOHTTP/HTTPS Web Server for ManagementProxy Mode and Peer-to-peer SIP Link ModeNTP for Auto Time SettingUDP/TCP/DNS-SRV(RFC 3263)TFTP/FTP/HTTP/HTTPS ProtocolsSupport HTTPS (SSL)Support SRTP for Voice Data EncryptionSupport Login for AdministrationOpenVPN, IEEE802.1X	SMS, MWI	Music on hold, Intercom			
Call CompletionAnonymous Call, Anonymous Call RejectionAdministrationFeaturesAuto provisioning using FTP/TFTP/HTTP/HTTPS/PnPDial through IP PBX Using Phone NumberConfiguration Managements with Web, Keypad on the phone, and Auto ProvisioningConfiguration Managements with Web, Keypad on the phone, and Auto ProvisioningSNMPTR069Network FeaturesSIP V1(RFC2543), V2(RFC3261)Fully Compatible with Asterisk, BroadSoft Platform LLDPQOSLLDPNAT Transverse: STUN ModeStatic IP/DHCP for IP configuration, pppoe3 DTMF modes: In-Band, RFC2833, SIP INFOHTTP/HTTPS Web Server for ManagementProxy Mode and Peer-to-peer SIP Link ModeNTP for Auto Time SettingUDP/TCP/DNS-SRV(RFC 3263)TFTP/FTP/HTTP/HTTPS ProtocolsSupport HTTPS (SSL)Support SRTP for Voice Data EncryptionSupport Login for AdministrationOpenVPN, IEEE802.1X	BLF(Busy Lamp Field)	Call Pickup, Group Call Pickup			
Administration FeaturesAuto provisioning using FTP/TFTP/HTTP/HTTPS/PnPDial through IP PBX Using Phone NumberConfiguration Managements with Web, Keypad on the phone, and Auto ProvisioningConfiguration Managements with Web, Keypad on the phone, and Auto ProvisioningSNMPTR069Network FeaturesSIP V1(RFC2543), V2(RFC3261)Fully Compatible with Asterisk, BroadSoft Platform QOSQOSLLDPNAT Transverse: STUN ModeStatic IP/DHCP for IP configuration, pppoe3 DTMF modes: In-Band, RFC2833, SIP INFOHTTP/HTTPS Web Server for Management NTP for Auto Time SettingProxy Mode and Peer-to-peer SIP Link ModeNTP for Auto Time SettingUDP/TCP/DNS-SRV(RFC 3263)TFTP/FTP/HTTP/HTTPS ProtocolsSupport HTTPS (SSL)Support SRTP for Voice Data Encryption OpenVPN, IEEE802.1X	Hot Desking	Call Recording			
Auto provisioning using FTP/TFTP/HTTP/HTTPS/PnPDial through IP PBX Using Phone NumberOrall through IP PBX Using URL AddressConfiguration Managements with Web, Keypad on the phone, and Auto ProvisioningDial through IP PBX Using URL AddressTR069SNMPTR069Network FeaturesSIP V1(RFC2543), V2(RFC3261)Fully Compatible with Asterisk, BroadSoft Platform QOSQOSLLDPNAT Transverse: STUN ModeStatic IP/DHCP for IP configuration, pppoe3 DTMF modes: In-Band, RFC2833, SIP INFOHTTP/HTTPS Web Server for ManagementProxy Mode and Peer-to-peer SIP Link ModeNTP for Auto Time SettingUDP/TCP/DNS-SRV(RFC 3263)TFTP/FTP/HTTP/HTTPS ProtocolsSecurity FeaturesSupport HTTPS (SSL)Support SRTP for Voice Data EncryptionSupport Login for AdministrationOpenVPN, IEEE802.1X	Call Completion	Anonymous Call, Anonymous Call Rejection			
Dial through IP PBX Using URL AddressConfiguration Managements with Web, Keypad on the phone, and Auto ProvisioningSNMPTR069Network FeaturesSIP V1(RFC2543), V2(RFC3261)Fully Compatible with Asterisk, BroadSoft Platform QOSQOSLLDPNAT Transverse: STUN ModeStatic IP/DHCP for IP configuration, pppoe3 DTMF modes: In-Band, RFC2833, SIP INFOHTTP/HTTPS Web Server for ManagementProxy Mode and Peer-to-peer SIP Link ModeNTP for Auto Time SettingUDP/TCP/DNS-SRV(RFC 3263)TFTP/FTP/HTTP/HTTPS ProtocolsSupport HTTPS (SSL)Support HTTPS (SSL)Support SRTP for Voice Data EncryptionSupport Login for AdministrationOpenVPN, IEEE802.1X	Administrati	on Features			
Dial through IP PBX Using URL Addressphone, and Auto ProvisioningSNMPTR069Network FeaturesSIP V1(RFC2543), V2(RFC3261)Fully Compatible with Asterisk, BroadSoft PlatformQOSLLDPNAT Transverse: STUN ModeStatic IP/DHCP for IP configuration, pppoe3 DTMF modes: In-Band, RFC2833, SIP INFOHTTP/HTTPS Web Server for ManagementProxy Mode and Peer-to-peer SIP Link ModeNTP for Auto Time SettingUDP/TCP/DNS-SRV(RFC 3263)TFTP/FTP/HTTP/HTTPS ProtocolsSupport HTTPS (SSL)Support SRTP for Voice Data EncryptionSupport Login for AdministrationOpenVPN, IEEE802.1X	Auto provisioning using FTP/TFTP/HTTP/HTTPS/PnP	Dial through IP PBX Using Phone Number			
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NAT Transverse: STUN ModeStatic IP/DHCP for IP configuration, pppoe3 DTMF modes: In-Band, RFC2833, SIP INFOHTTP/HTTPS Web Server for ManagementProxy Mode and Peer-to-peer SIP Link ModeNTP for Auto Time SettingUDP/TCP/DNS-SRV(RFC 3263)TFTP/FTP/HTTP/HTTPS ProtocolsSecurity FeaturesSupport HTTPS (SSL)Support SRTP for Voice Data EncryptionSupport Login for AdministrationOpenVPN, IEEE802.1X	SIP V1(RFC2543), V2(RFC3261)	Fully Compatible with Asterisk, BroadSoft Platform			
3 DTMF modes: In-Band, RFC2833, SIP INFOHTTP/HTTPS Web Server for ManagementProxy Mode and Peer-to-peer SIP Link ModeNTP for Auto Time SettingUDP/TCP/DNS-SRV(RFC 3263)TFTP/FTP/HTTP/HTTPS ProtocolsSecurity FeaturesSupport HTTPS (SSL)Support Login for AdministrationOpenVPN, IEEE802.1X	QOS	LLDP			
Proxy Mode and Peer-to-peer SIP Link ModeNTP for Auto Time SettingUDP/TCP/DNS-SRV(RFC 3263)TFTP/FTP/HTTP/HTTPS ProtocolsSecurity FeaturesSupport HTTPS (SSL)Support SRTP for Voice Data EncryptionSupport Login for AdministrationOpenVPN, IEEE802.1X	NAT Transverse: STUN Mode	Static IP/DHCP for IP configuration, pppoe			
UDP/TCP/DNS-SRV(RFC 3263)     TFTP/FTP/HTTP/HTTPS Protocols       Security Features       Support HTTPS (SSL)     Support SRTP for Voice Data Encryption       Support Login for Administration     OpenVPN, IEEE802.1X	3 DTMF modes: In-Band, RFC2833, SIP INFO				
Security Features         Support HTTPS (SSL)       Support SRTP for Voice Data Encryption         Support Login for Administration       OpenVPN, IEEE802.1X	Proxy Mode and Peer-to-peer SIP Link Mode	NTP for Auto Time Setting			
Support HTTPS (SSL)       Support SRTP for Voice Data Encryption         Support Login for Administration       OpenVPN, IEEE802.1X	UDP/TCP/DNS-SRV(RFC 3263)	TFTP/FTP/HTTP/HTTPS Protocols			
Support Login for Administration OpenVPN, IEEE802.1X	Security Features				
	Support HTTPS (SSL)	Support SRTP for Voice Data Encryption			
Keypad Lock Prevent SIP Hacking	Support Login for Administration	OpenVPN, IEEE802.1X			
	Keypad Lock	Prevent SIP Hacking			

#### Test setup:

- 1. Measurement is done at 3 meter distance with LPDA antenna used as a receiving antenna at Multi-Purpose Building location (MPB).
- 2. LPDA Antenna is connected with 20dB post-amplifier.
- 3. Measurement is done in the horizontal and vertical polarization mode with various test conditions as follows.
  - a) Phone powered (ON) with external DC (+5V) power supply.
  - b) Phone ON with Ethernet cable connected to device at one end and other end connected to Ethernet switch outside the shielded lab.
  - c) Phone ON in calling mode (Another phone kept outside the shielded lab connected via Ethernet cable thru network switch)
- 4. Measurement frequency range: 30MHz to 2 GHz frequency range.

#### Measurement Results:

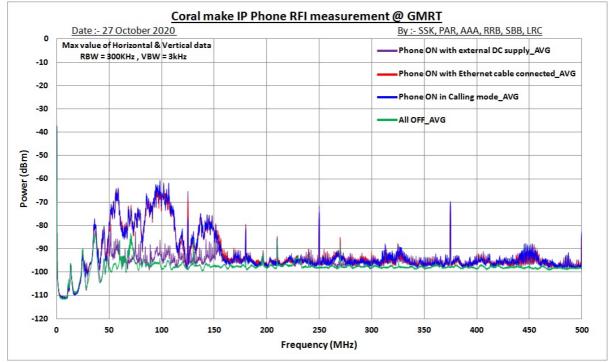


Fig.1:- Max Value of all data for Horizontal & Vertical polarization in the Frequency band 0-500MHz.

- 1. **Violet line** shows broad band RF noise 1-20dB above the noise floor level when Phone powered (ON) with external DC (+5V) power supply in trace Average mode.
- 2. **Red line** shows broad band RF noise 1-38dB above the noise floor level when Phone ON with Ethernet cable connected to device at one end and other end connected to Ethernet switch outside the shielded lab in trace Average mode.
- 3. **Dark blue line** shows broad band RF noise 1-38dB above the noise floor level when Phone ON in calling mode (Another phone kept outside the shielded lab) in trace Average mode.
- 4. Green line shows the ambient noise floor level in All OFF with trace Average mode.

Note: - The periodic lines have been observed at the interval of 125MHz in the frequency band from 0-2000MHz for all test conditions.

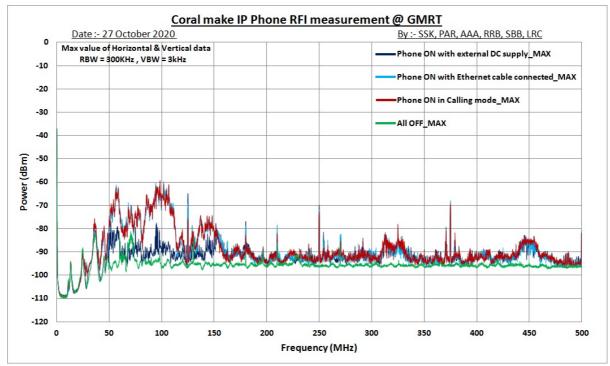
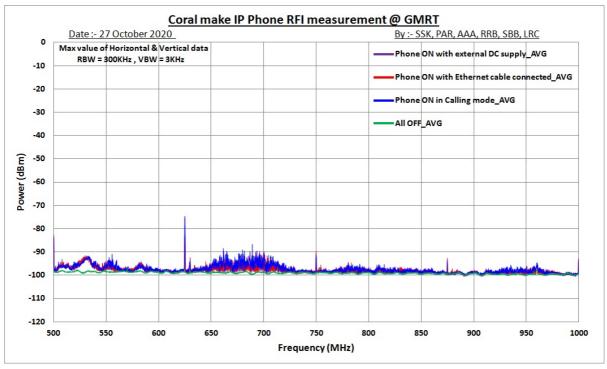


Fig.2:- Max Value of all data for Horizontal & Vertical polarization in the Frequency band 0-500MHz.

- 1. **Navy blue line** shows broad band RF noise 1-20dB above the noise floor level when Phone powered (ON) with external DC (+5V) power supply in trace Maxhold mode.
- 2. Sky Blue line shows broad band RF noise 1-40dB above the noise floor level when Phone ON with Ethernet cable connected to device at one end and other end connected to Ethernet switch outside the shielded lab in trace Maxhold mode.
- 3. **Brown line** shows broad band RF noise 1-40dB above the noise floor level when Phone ON in calling mode (Another phone kept outside the shielded lab) in trace Maxhold mode.
- 4. Green line shows the ambient noise floor level in All OFF with trace Maxhold mode.



**Fig.3**:- Max Value of all data for Horizontal & Vertical polarization in the Frequency band 500-1000MHz. 1. **Violet line** shows broad band RF noise 1-8dB above the noise floor level when Phone powered (ON) with

external DC (+5V) power supply in trace Average mode.

- 2. **Red line** shows broad band RF noise 1-8dB above the noise floor level when Phone ON with Ethernet cable connected to device at one end and other end connected to Ethernet switch outside the shielded lab in trace Average mode.
- 3. **Dark blue line** shows broad band RF noise 1-10dB above the noise floor level when Phone ON in calling mode (Another phone kept outside the shielded lab) in trace Average mode.
- 4. Green line shows the ambient noise floor level in All OFF with trace Average mode.

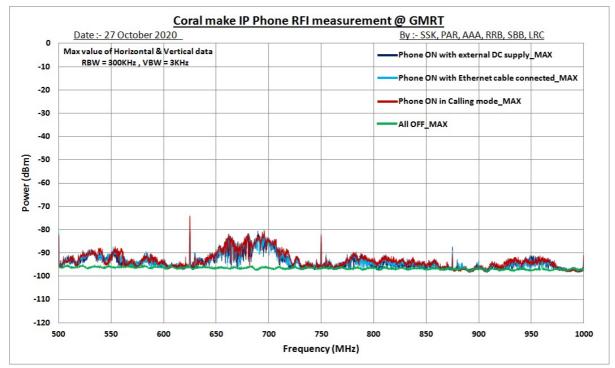
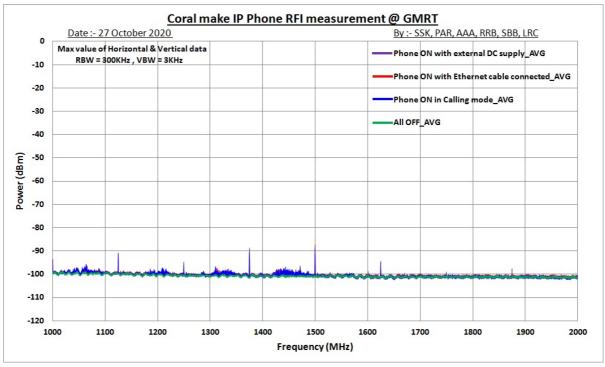


Fig.4:- Max Value of all data for Horizontal & Vertical polarization in the Frequency band 500-1000MHz.

- 1. **Navy blue line** shows broad band RF noise 1-12dB above the noise floor level when Phone powered (ON) with external DC (+5V) power supply in trace Maxhold mode.
- 2. Sky Blue line shows broad band RF noise 1-12dB above the noise floor level when Phone ON with Ethernet cable connected to device at one end and other end connected to Ethernet switch outside the shielded lab in trace Maxhold mode.
- 3. **Brown line** shows broad band RF noise 1-15dB above the noise floor level when Phone ON in calling mode (Another phone kept outside the shielded lab) in trace Maxhold mode.
- 4. Green line shows the ambient noise floor level in All OFF with trace Maxhold mode.



**Fig.5**:- Max Value of all data for Horizontal & Vertical polarization in the Frequency band 1000-2000MHz. 1. **Violet line** shows broad band RF noise 1-2dB above the noise floor level when Phone powered (ON) with

external DC (+5V) power supply in trace Average mode.

- 2. **Red line** shows broad band RF noise 1-2dB above the noise floor level when Phone ON with Ethernet cable connected to device at one end and other end connected to Ethernet switch outside the shielded lab in trace Average mode.
- 3. **Dark blue line** shows broad band RF noise 1-3dB above the noise floor level when Phone ON in calling mode (Another phone kept outside the shielded lab) in trace Average mode.
- 4. Green line shows the ambient noise floor level in All OFF with trace Average mode.

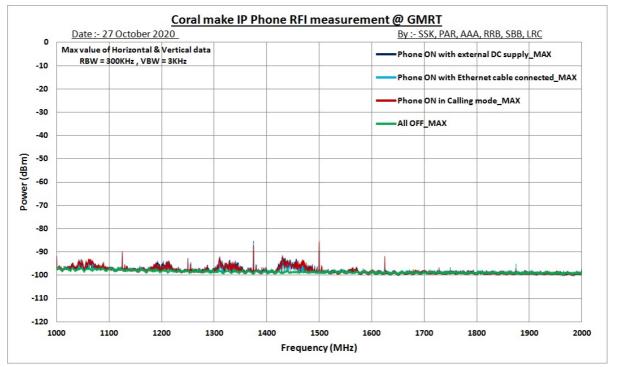


Fig.6:- Max Value of all data for Horizontal & Vertical polarization in the Frequency band 1000-2000MHz.

- 1. **Navy blue line** shows broad band RF noise 1-3dB above the noise floor level when Phone powered (ON) with external DC (+5V) power supply in trace Maxhold mode.
- 2. Sky Blue line shows broad band RF noise 1-3dB above the noise floor level when Phone ON with Ethernet cable connected to device at one end and other end connected to Ethernet switch outside the shielded lab in trace Maxhold mode.
- 3. **Brown line** shows broad band RF noise 1-5dB above the noise floor level when Phone ON in calling mode (Another phone kept outside the shielded lab) in trace Maxhold mode.
- 4. Green line shows the ambient noise floor level in All OFF with trace Maxhold mode.

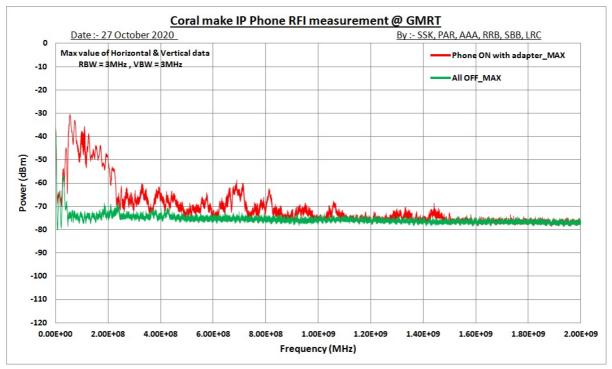


Fig.7:- Max Value of all data for Horizontal & Vertical polarization in the Frequency band 0-2000MHz.

- 1. **Red line** shows broad band RF noise 1-42dB above the noise floor level in 0-2000MHz frequency band when Phone ON with DC adapter (+5V) in trace Maxhold mode.
- 2. Green line shows the ambient noise floor level in the All OFF condition with trace in Maxhold mode.

#### Images:



Image1: Coral make IP Phone Model No. IP2LP (Front View)

#### Conclusion:-

Maximum Broad band and Periodic Radio frequency emission generated by the IP Phone above ambient noise floor level (All OFF condition) is tabulated as follows.

Frequency (MHz)	Broad Band RF Noise Level (dB)		Periodic Lines level spaced at 125MHz
	AVG	MAX	(dB)
0-500 MHz	1-38	1-40	1-32
500-1000 MHz	1-10	1-15	1-23
1000-2000 MHz	1-3	1-5	1-13

Table1: Maximum values of all Average and Maxhold data (LPDA Horizontal & Vertical polarization).

The **Coral make IP phone (Model No. IP2LP)** produces broad band radio frequency emission (RFI) 1-40dB above the ambient noise floor level (all OFF mode) in the frequency band from 30-2000MHz for all test conditions and hence may not be a suitable option to be used inside the GMRT premises without shielding solution.

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