

Note: The BS spurious in-band of Middle Channel transmission level is below the indicated limit.

7.7. Out-of-Band Emissions, Conducted

7.7.1. Test Limit

$f \leq 1.25$ MHz outside UPCS band: ≤ -9.5 dBm

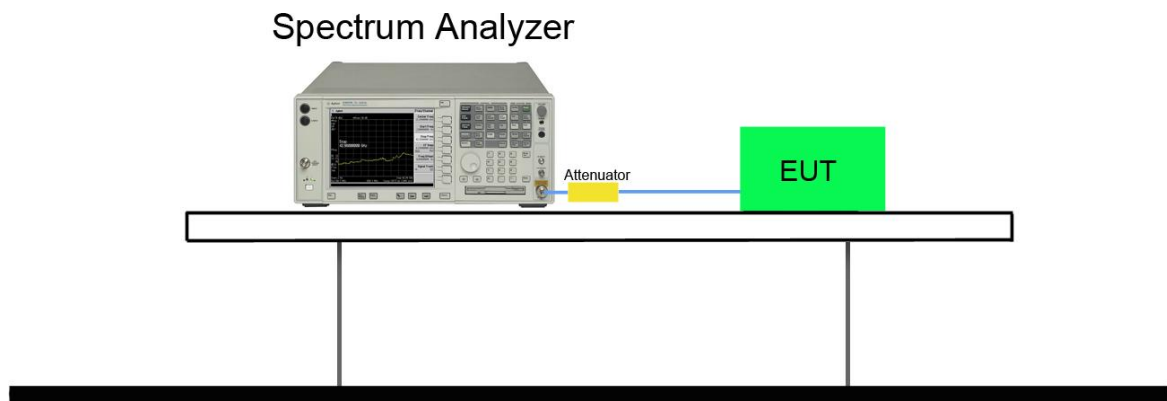
1.25 MHz $\leq f \leq 2.5$ MHz outside UPCS band: ≤ -29.5 dBm

$f \leq 2.5$ MHz outside UPCS band: ≤ -39.5 dBm

7.7.2. Test Procedure Used

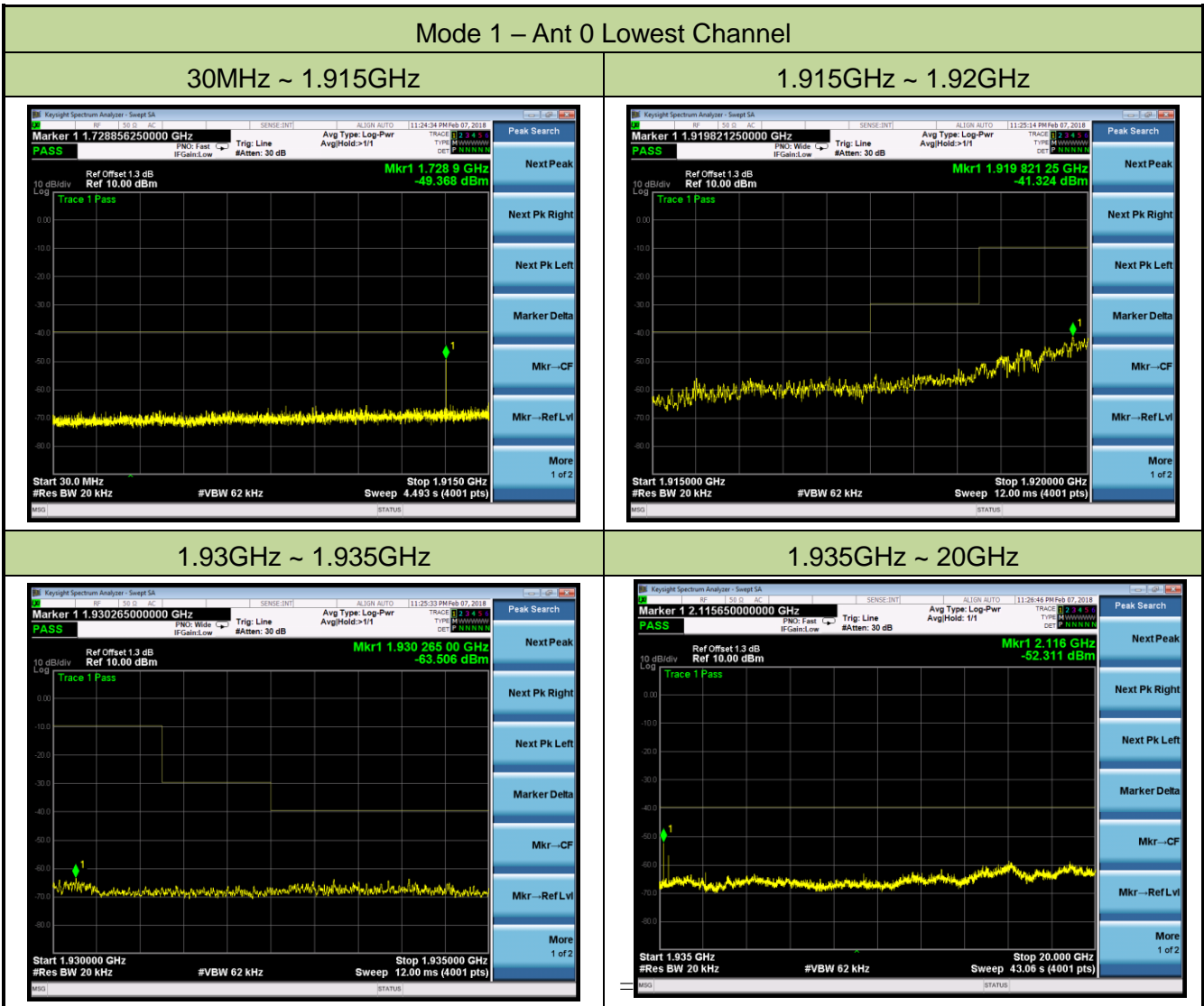
ANSI C63.17, Clause 6.1.6.2

7.7.3. Test Setup



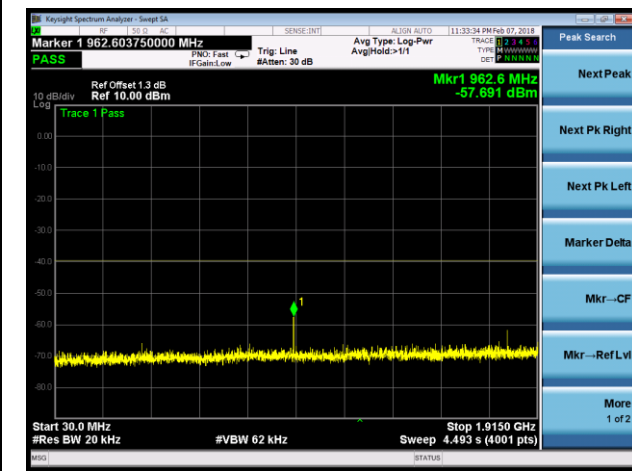
7.7.4. Test Result

Product	DECT USB Dongle	Temperature	24°C
Test Engineer	Dandy Li	Relative Humidity	51%
Test Site	TR3	Test Date	2018/02/07
Test Mode	Mode 1		

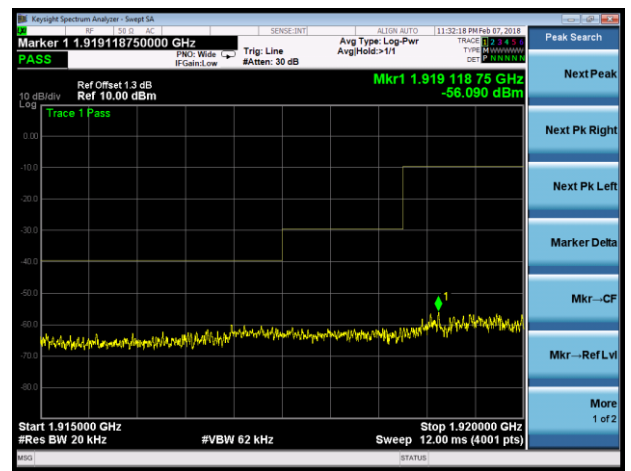


Mode 1 – Ant 0 Middle Channel

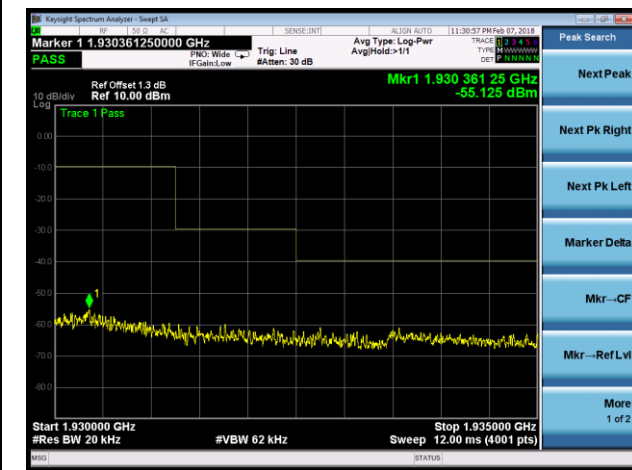
30MHz ~ 1.915GHz



1.915GHz ~ 1.92GHz



1.93GHz ~ 1.935GHz

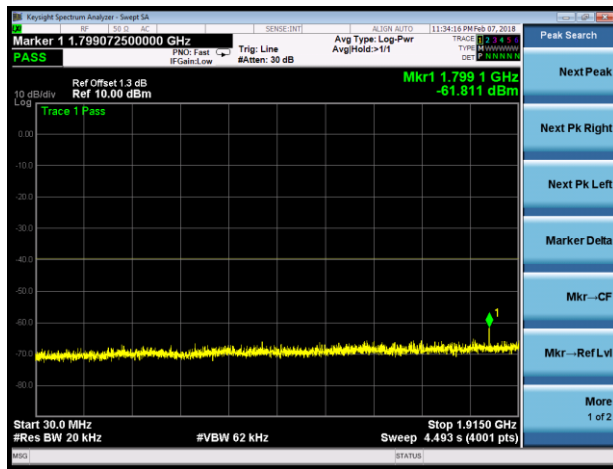


1.935GHz ~ 20GHz

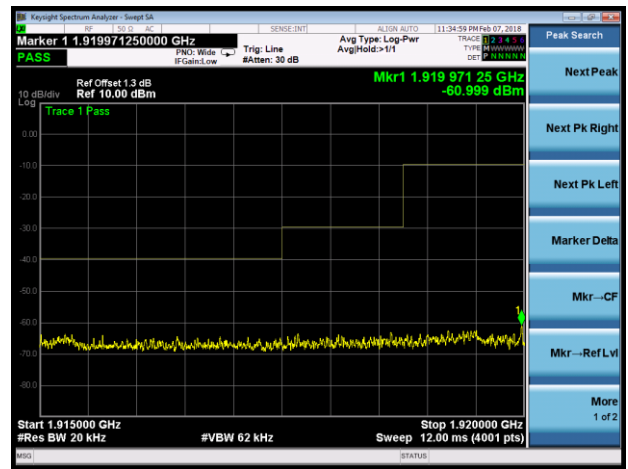


Mode 1 – Ant 0 Highest Channel

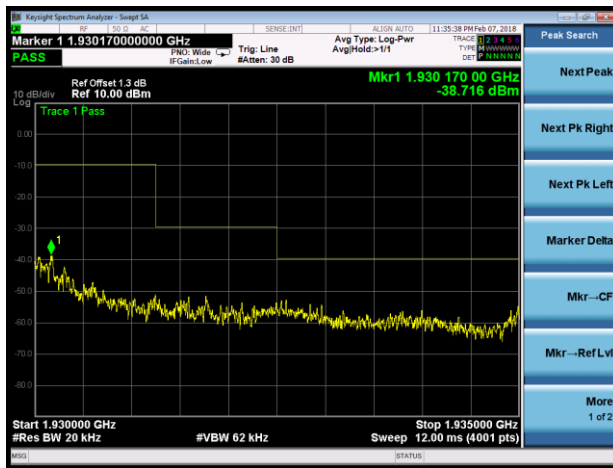
30MHz ~ 1.915GHz



1.915GHz ~ 1.92GHz



1.93GHz ~ 1.935GHz

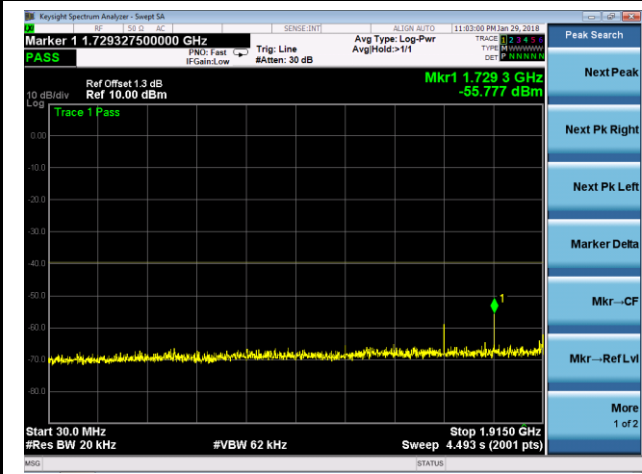


1.935GHz ~ 20GHz

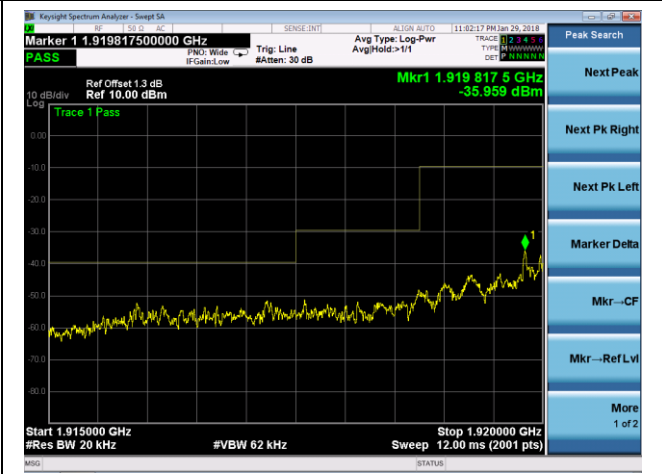


Mode 1 – Ant 1 Lowest Channel

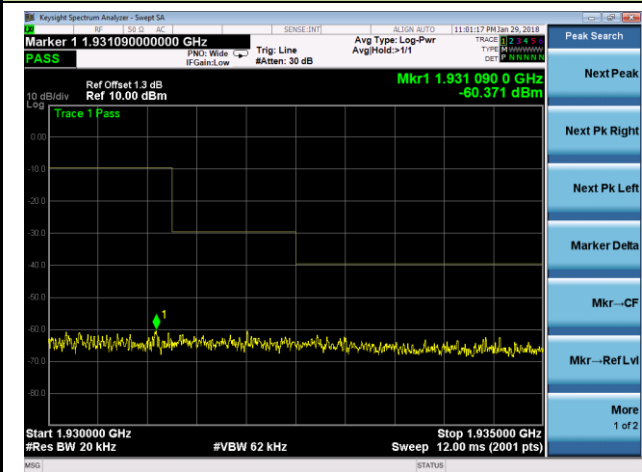
30MHz ~ 1.915GHz



1.915GHz ~ 1.92GHz



1.93GHz ~ 1.935GHz

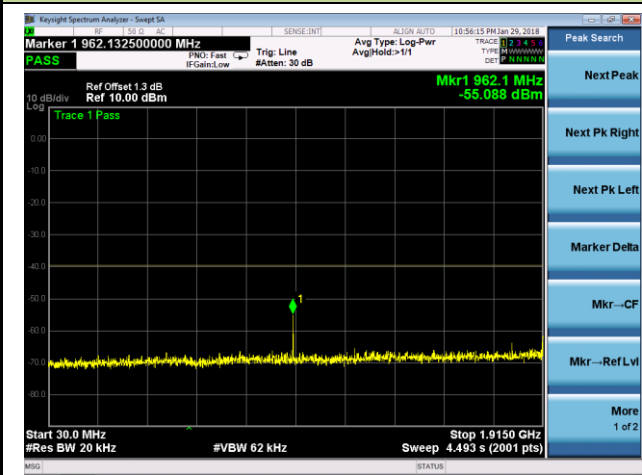


1.935GHz ~ 20GHz

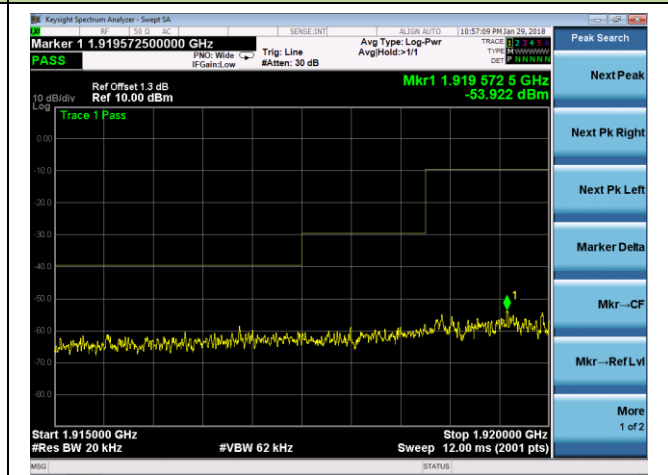


Mode 1 – Ant 1 Middle Channel

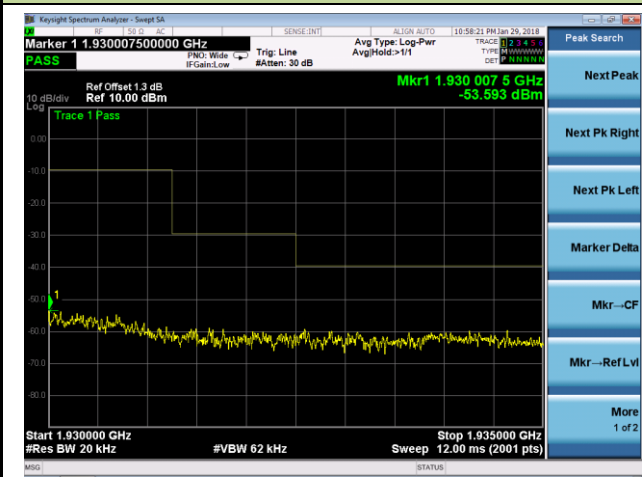
30MHz ~ 1.915GHz



1.915GHz ~ 1.92GHz



1.93GHz ~ 1.935GHz

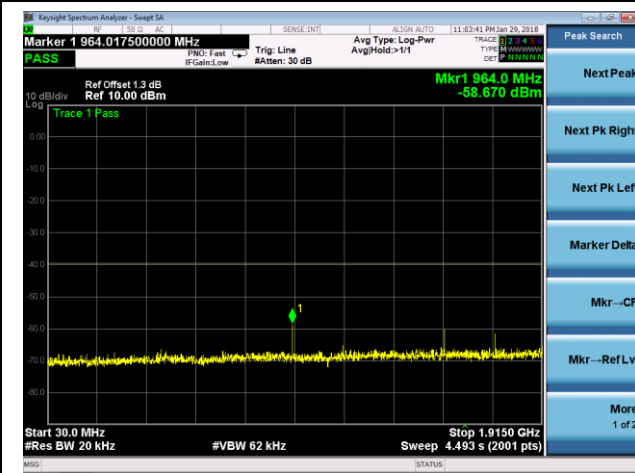


1.935GHz ~ 20GHz

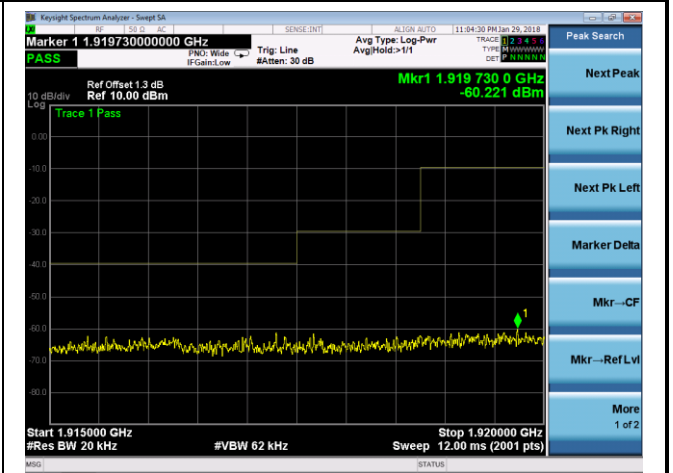


Mode 1 – Ant 1 Highest Channel

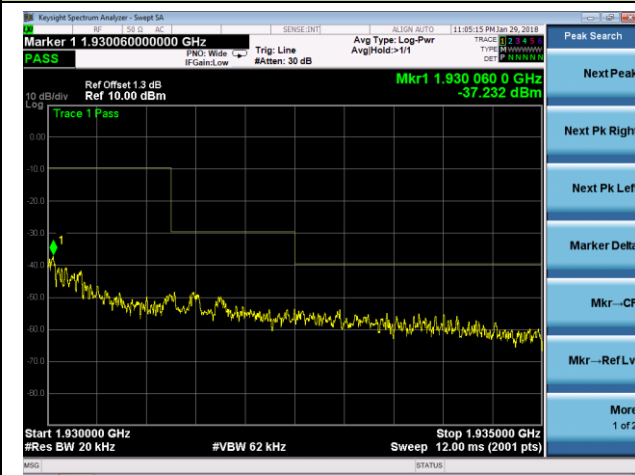
30MHz ~ 1.915GHz



1.915GHz ~ 1.92GHz



1.93GHz ~ 1.935GHz

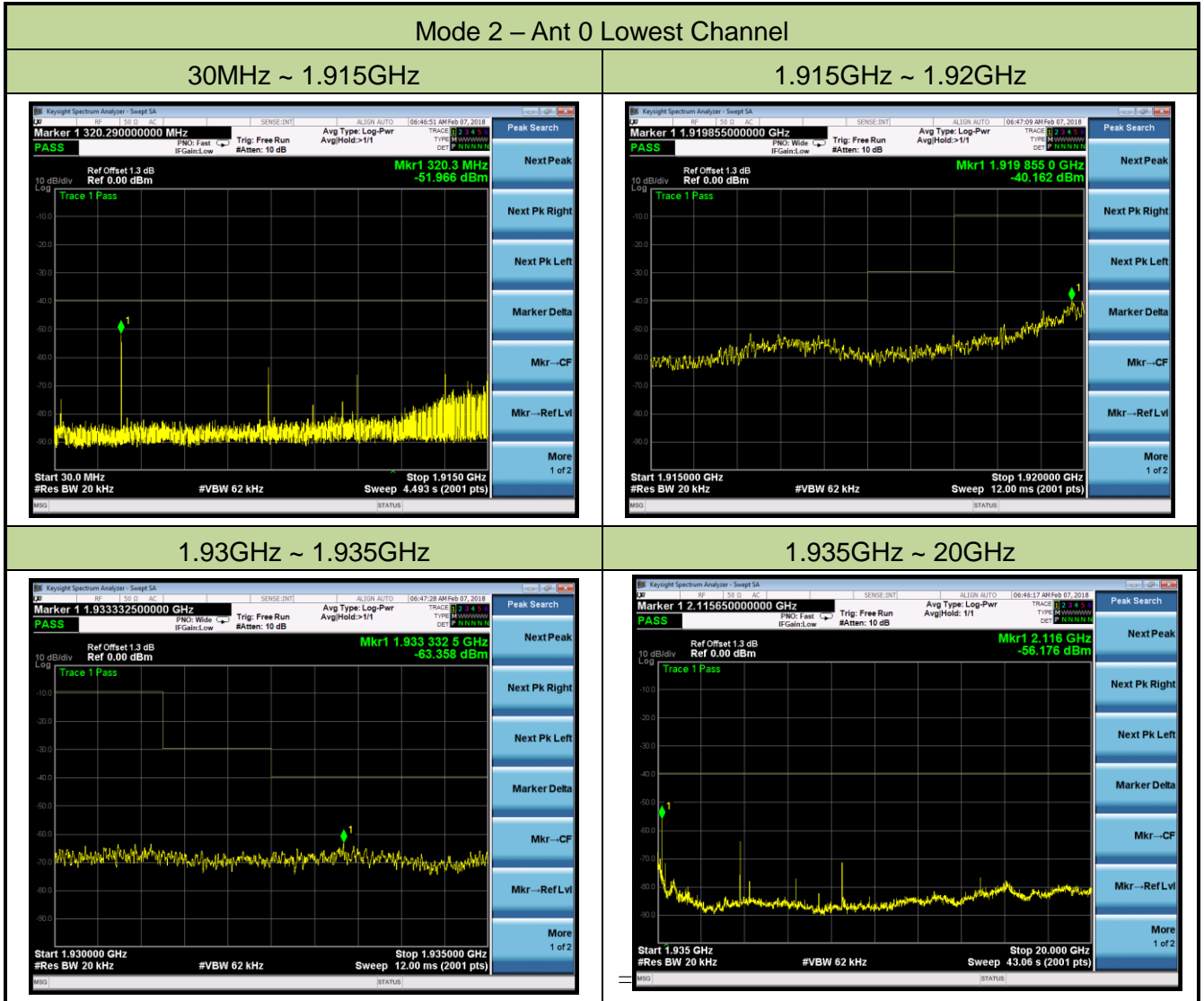


1.935GHz ~ 20GHz



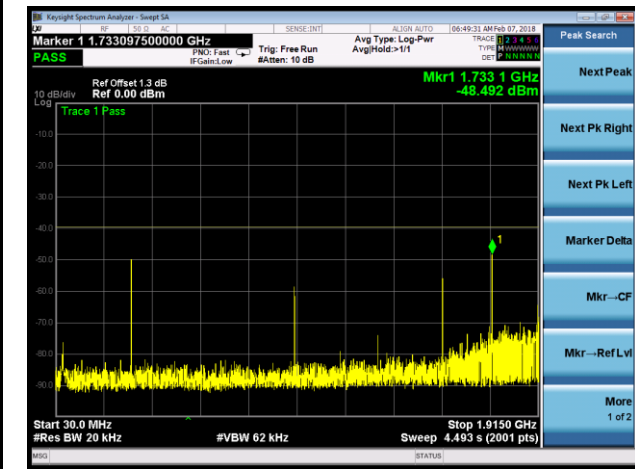
Note: The BS spurious out-of-band transmission level is below the indicated limit.

Product	DECT USB Dongle	Temperature	24°C
Test Engineer	Dandy Li	Relative Humidity	51%
Test Site	TR3	Test Date	2018/02/07
Test Mode	Mode 2		

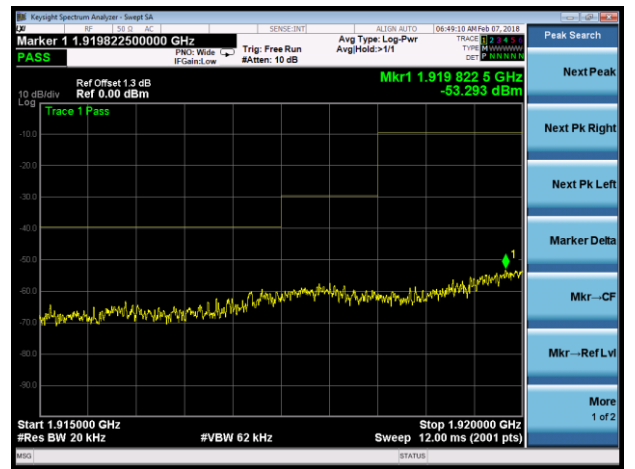


Mode 2 – Ant 0 Middle Channel

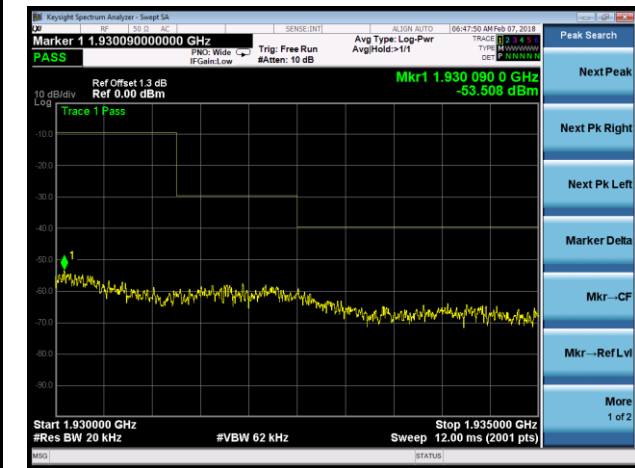
30MHz ~ 1.915GHz



1.915GHz ~ 1.92GHz



1.93GHz ~ 1.935GHz

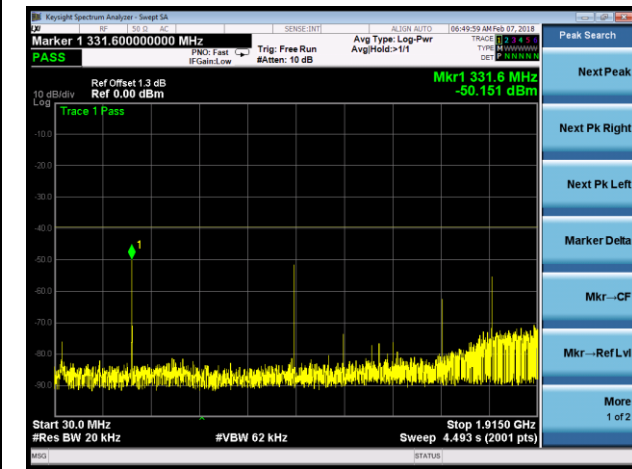


1.935GHz ~ 20GHz

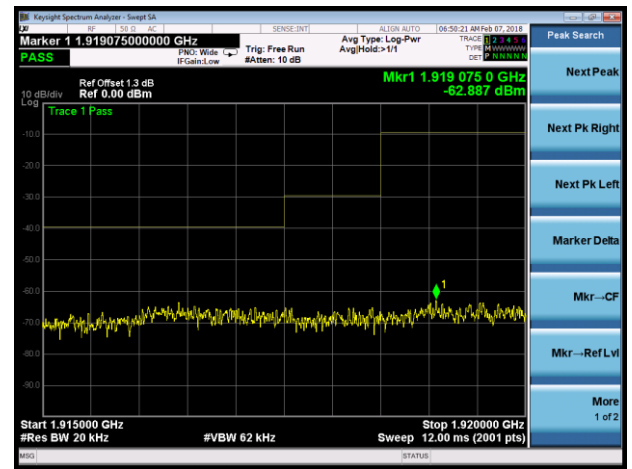


Mode 2 – Ant 0 Highest Channel

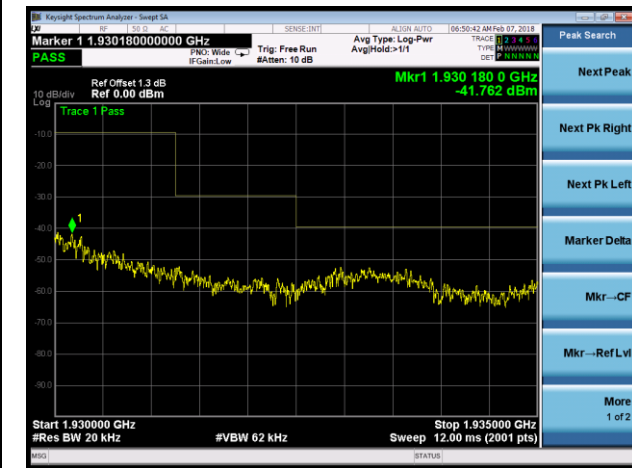
30MHz ~ 1.915GHz



1.915GHz ~ 1.92GHz



1.93GHz ~ 1.935GHz

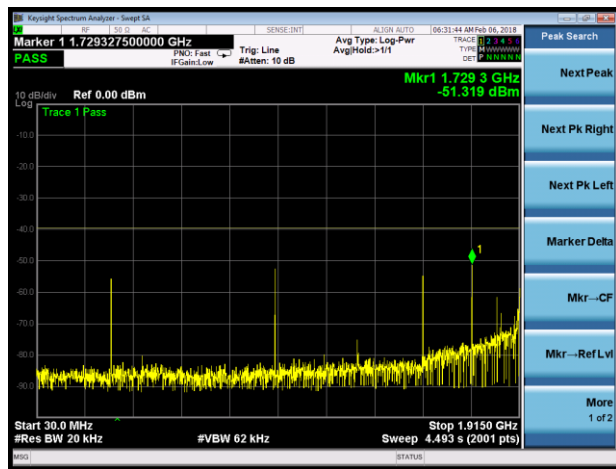


1.935GHz ~ 20GHz



Mode 2 – Ant 1 Lowest Channel

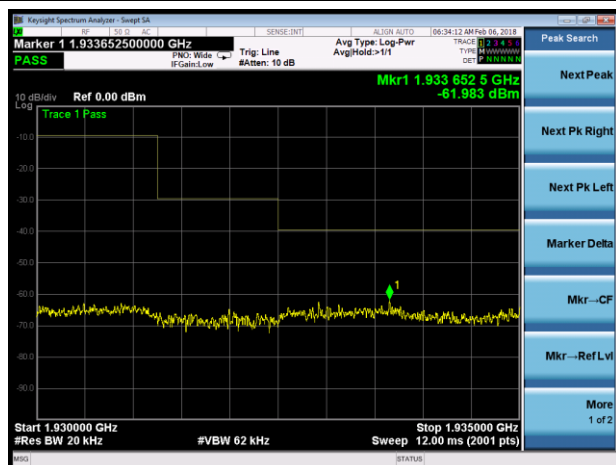
30MHz ~ 1.915GHz



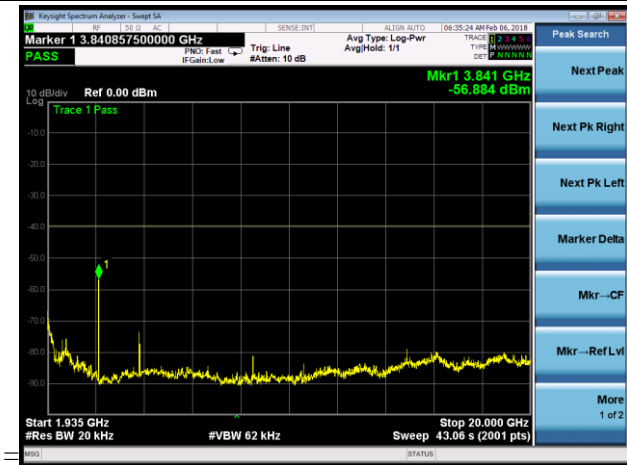
1.915GHz ~ 1.92GHz



1.93GHz ~ 1.935GHz

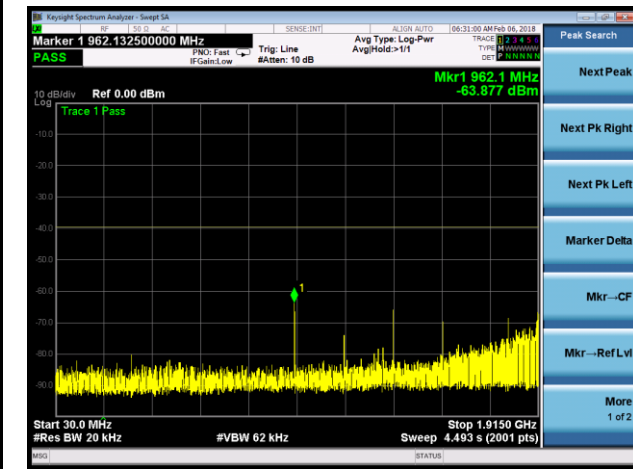


1.935GHz ~ 20GHz

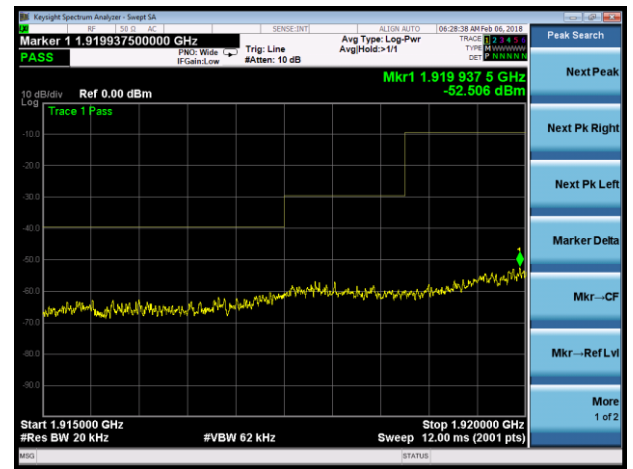


Mode 2 – Ant 1 Middle Channel

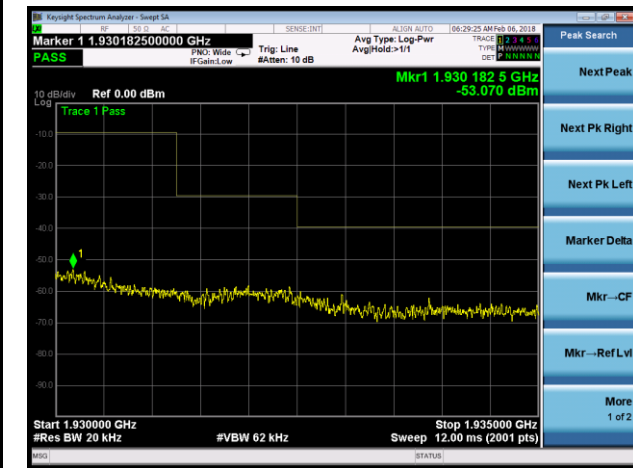
30MHz ~ 1.915GHz



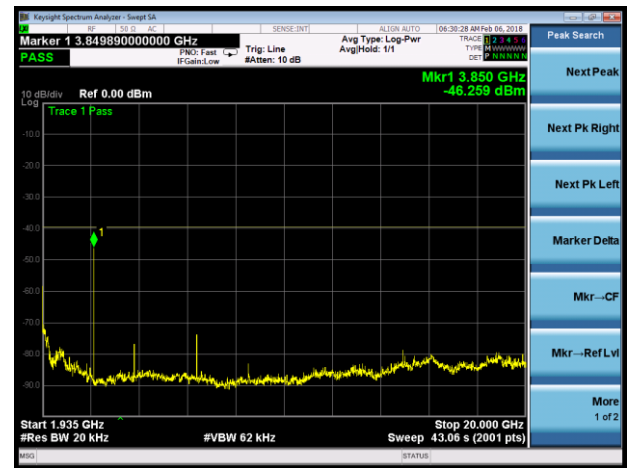
1.915GHz ~ 1.92GHz



1.93GHz ~ 1.935GHz

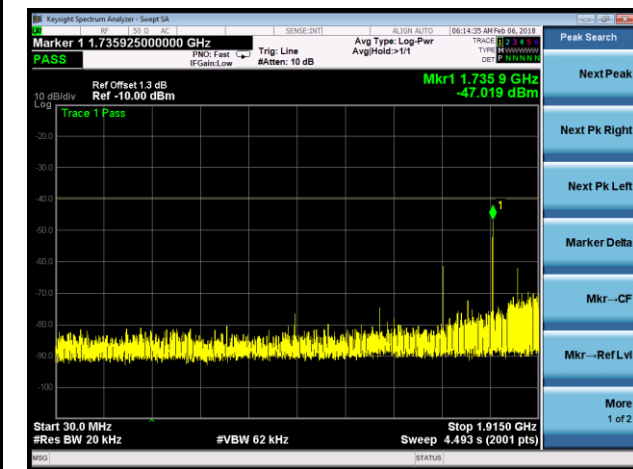


1.935GHz ~ 20GHz

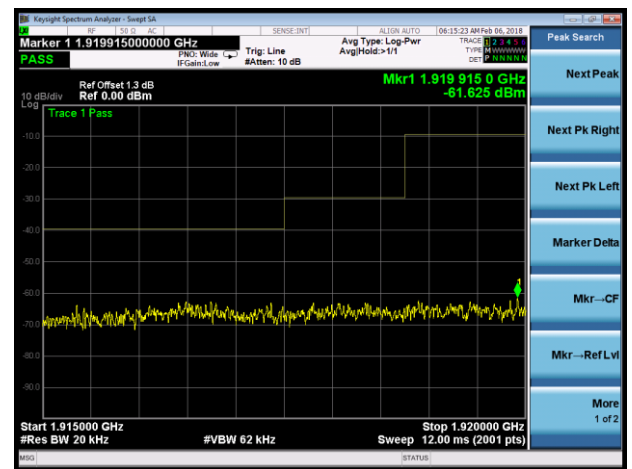


Mode 2 – Ant 1 Highest Channel

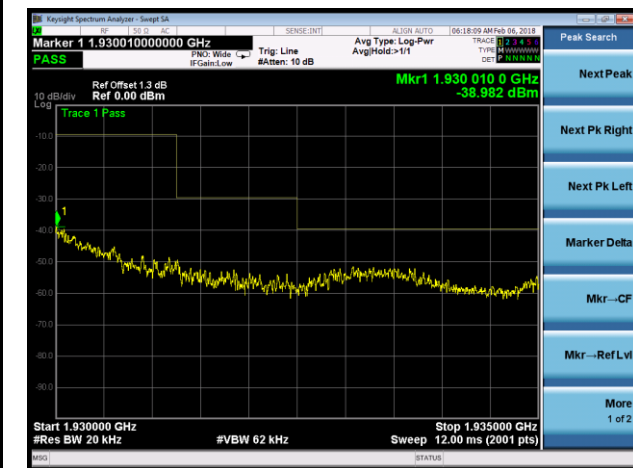
30MHz ~ 1.915GHz



1.915GHz ~ 1.92GHz



1.93GHz ~ 1.935GHz



1.935GHz ~ 20GHz



Note: The BS spurious out-of-band transmission level is below the indicated limit.

7.8. Carrier Frequency Stability

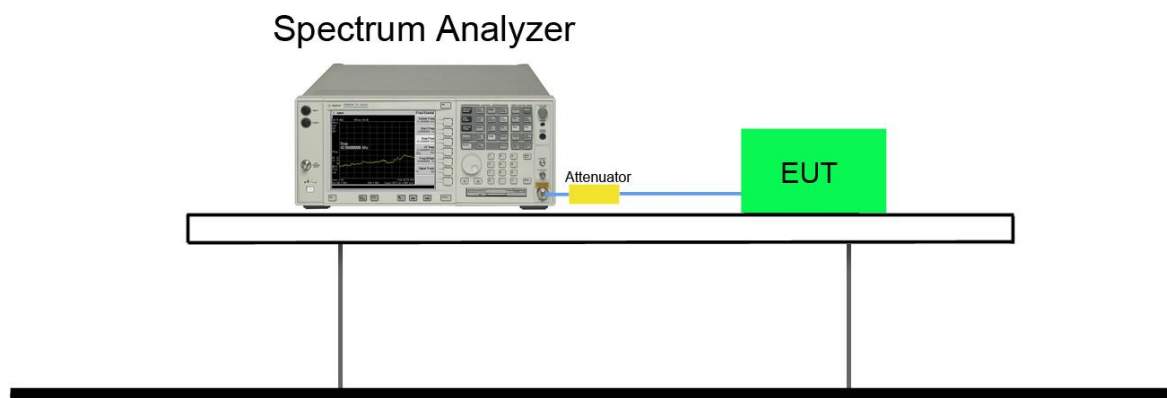
7.8.1. Test Limit

Per §15.323(f), the frequency stability of the carrier frequency of the intentional radiator shall be maintained within ± 10 ppm over 1 hour or the interval between channel access monitoring, whichever is shorter. The frequency stability shall be maintained over a temperature variation of -20°C to $+50^{\circ}\text{C}$ at normal supply voltage, and over a variation in the primary supply voltage of 85 percent to 115 percent of the rated supply voltage at a temperature of 20°C . For equipment that is capable only of operating from a battery, the frequency stability tests shall be performed using a new battery without any further requirement to vary supply voltage.

7.8.2. Test Procedure Used

ANSI C63.17, Clause 6.2.1

7.8.3. Test Setup



7.8.4. Test Result

The Frequency Stability is measured with the RTX. The RTX was logged by a computer programmed to get the new readings as fast as possible (about 3 readings per second) over the noted time period or number of readings. The peak-to-peak difference was recorded and the mean value and deviation in ppm was calculated.

The Carrier Frequency Stability over power Supply Voltage and over Temperature is measured also with the RTX.

Carrier Frequency Stability over Time at Nominal Temperature

Average Mean Carrier Frequency (MHz)	Max. Diff. (kHz)	Min. Diff. (kHz)	Max Dev. (ppm)	Limit (ppm)
Mode 1				
1924.994837	4.1	1.0	1.6	±10
Mode 2				
1924.997233	5.6	0.7	2.5	±10

Deviation ppm = ((Max. Diff. - Mean. Diff.) / Mean Carrier Freq.) x 106

Deviation (ppm) is calculated from 3000 readings with the RTX.

Carrier Frequency Stability over Time at Nominal Temperature

Voltage	Measured Carrier Frequency (MHz)	Difference (kHz)	Deviation (ppm)	Limit (ppm)
Mode 1				
Vnom	1924.9948	3.1	1.61	±10
85% of Vnom	1924.9940	3.5	1.82	
115% of Vnom	1924.9942	3.7	1.92	
Mode 2				
Vnom	1924.9972	3.9	2.03	±10
85% of Vnom	1924.9968	4.2	2.18	
115% of Vnom	1924.9966	3.8	1.97	

$$\text{Deviation ppm} = ((\text{Mean} - \text{Measured frequency}) / \text{Mean}) \times 10^6$$

Carrier Frequency Stability over Temperature

Voltage	Measured Carrier Frequency (MHz)	Difference (kHz)	Deviation (ppm)	Limit (ppm)
Mode 1				
T = +20°C	1924.994	Ref	Ref	±10
T = -20°C	1924.994	1.5	0.78	
T = +50°C	1924.994	2.1	1.09	
Mode 2				
T = +20°C	1924.997	Ref	Ref	±10
T = -20°C	1924.998	1.7	0.88	
T = +50°C	1924.997	2.4	1.25	

$$\text{Deviation ppm} = ((\text{Mean} - \text{Measured frequency}) / \text{Mean}) \times 10^6$$

7.9. Specific Requirements for UPCS Device

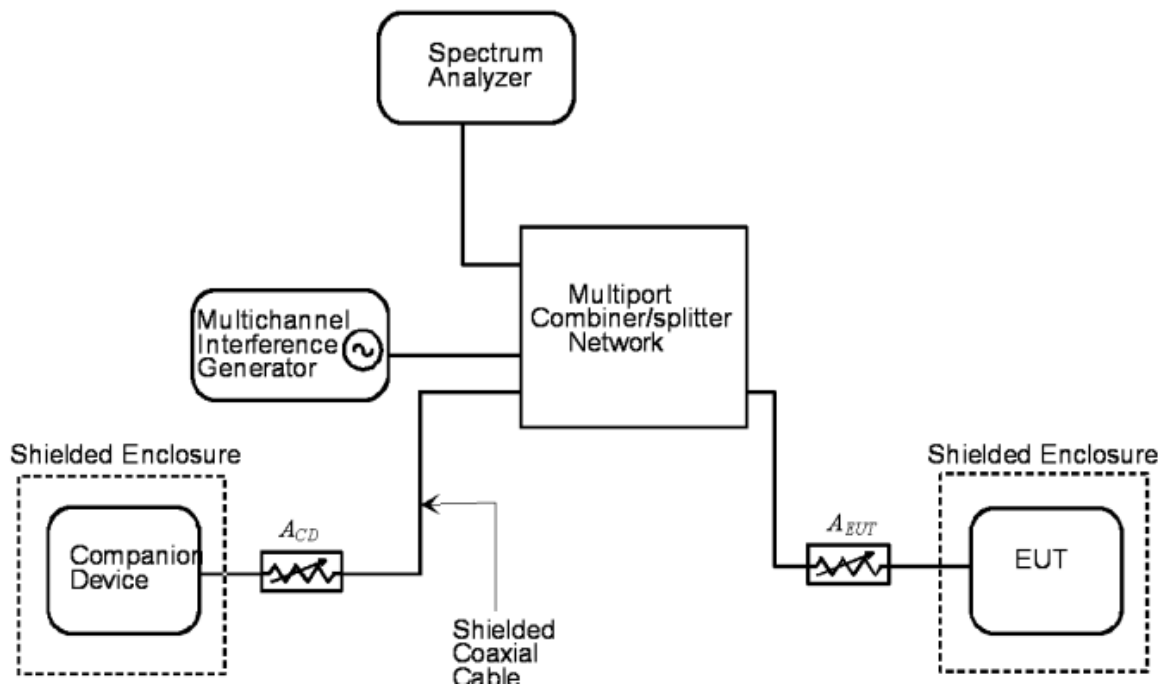
7.9.1. Monitoring Time Requirements

Immediately prior to initiating transmission, devices must monitor the combined time and spectrum window in which they intend to transmit. For a period of at least 10 milliseconds for systems designed to use a 10 milliseconds or shorter frame period or at least 20 milliseconds for systems designed to use a 20 milliseconds frame period

7.9.1.1. Test Procedure Used

ANSI C63.17, Clause 7.5

7.9.1.2. Test Setup



7.9.1.3. Test Result

Interference (Refer to ANSIC63.17 clause 7.3.4)	Reaction of EUT	Results
Apply the interference on f1 at level TU+UM, and no interference on f2. Initiate transmission and verify the transmission on f2.	EUT transmits on f2	Pass
Apply the interference on f2 at level TU+UM, at the same time, no interference on f1. After about 20ms, initiate transmission and verify the transmission on f1.	EUT transmits on f1	Pass

7.9.2.Lowest Monitoring Threshold Requirements

The monitoring threshold must not be more than 30 dB above the thermal noise power for a bandwidth equivalent to the emission bandwidth used by the device.

7.9.2.1. Test Procedure Used

ANSI C63.17, Clause 7.3.1

7.9.2.2. Test Result

Not Apply

7.9.3. Acknowledgements and Transmission Duration Requirements

Occupation of the same combined time and spectrum windows by a device or group of cooperating devices continuously over a period of time longer than 8 hours is not permitted without repeating the access criteria.

Once access to specific combined time and spectrum windows is obtained an acknowledgement from a system participant must be received by the initiating transmitter within one second or transmission must cease.

Periodic acknowledgements must be received at least every 30 seconds or transmission must cease. Channels used exclusively for control and signaling information may transmit continuously for 30 seconds without receiving an acknowledgement, at which time the access criteria must be repeated.

7.9.3.1. Test Procedure Used

ANSI C63.17, Clause 8.2.1 & 8.2.2

7.9.3.2. Test Result

Test ref. to ANSI C63.17 clause 8.2.1	Observation	Verdict
Initial transmission without acknowledgements	Not applicable for EUT that transmits control and signaling information	N/A
Transmission time after loss of acknowledgements	10.0	Pass

Test ref. to ANSI C63.17 clause 8.2.2	Observation	Verdict
Transmission duration on same time and frequency window	Only for initiating device that controls which time slot is used	N/A

7.9.4. Least Interfered Channel (LIC) Selection Requirements

If access to spectrum is not available as determined by the above, and a minimum of 40 duplex system access channels are defined for the system, the time and spectrum windows with the lowest power level below a monitoring threshold of 50 dB above the thermal noise power determined for the emission bandwidth may be accessed.

Calculation of monitoring threshold limits for isochroous devices:

Lowest threshold: $TL = -174 + 10\log_{10}B + M_u + P_{MAX} - P_{EUT}$ (dBm)

Upper threshold: $TU = -174 + 10\log_{10}B + M_u + P_{MAX} - P_{EUT}$ (dBm)

Where: B=Emission bandwidth (Hz)

M_u =dB the threshold may exceed thermal noise (30 for T_L & 50 for T_U)

$P_{MAX} = 5 * \log_{10}B - 10$ (dBm)

P_{EUT} =Transmitted power (dBm)

Monitor Threshold	B (MHz)	M_u (dB)	P_{MAX} (dBm)	P_{EUT} (dBm)	Threshold (dBm)
Mode 1					
TL	1.394	30	20.72	19.45	-81.29
TU	1.394	50	20.72	19.45	-61.29
Mode 2					
TL	1.410	30	20.74	21.25	-83.02
TU	1.410	50	20.74	21.25	-63.02

The EUT must not transmit until the interference level is less than or equal to:

Measured Threshold Level $\leq TU$

Where: TU=Upper threshold level

7.9.4.1. Test Procedure Used

ANSI C63.17, Clause 7.3.2 & 7.3.3 & 7.3.4

7.9.4.2. Test Result

Monitor threshold	Measured Threshold Level	Limit (dBm)
Mode 1		
Lowest Threshold (dBm)	N/A	-81.29
Upper Threshold (dBm)	N/A	-61.29
Mode 2		
Lowest Threshold (dBm)	N/A	-83.02
Upper Threshold (dBm)	N/A	-63.02

Note: N/A Not applicable- EUT which supports at least of 40 duplex system access channels and implements Least Interfered Channel (LIC) algorithm is permitted to use an upper monitoring threshold.

7.9.5. Random waiting Requirements

If the selected combined time and spectrum windows are unavailable, the device may either monitor and select different windows or seek to use the same window after waiting an amount of time, randomly chosen from a uniform random distribution between 10 and 150 milliseconds, commencing when the channel becomes available.

7.9.5.1. Test Procedure Used

ANSI C63.17, Clause 8.1.3

7.9.5.2. Test Result

The manufacturer declares that this provision is not utilized by the EUT

7.9.6. Monitoring Bandwidth Requirements

The monitoring system bandwidth must be equal to or greater than the emission bandwidth of the intended transmission and have a maximum reaction time less than $50 \times \text{SQRT}(1.25/\text{emission bandwidth in MHz})$ microseconds for signals at the applicable threshold level but shall not be required to be less than 50 microseconds

7.9.6.1. Test Procedure Used

ANSI C63.17, Clause 7.5

7.9.6.2. Test Result

Test Equation (μs)	B (MHz)	Pulse width(μs)	Limit (us)	Result
Mode 1				
$50 (1.25/B)^{1/2}$	1.394	47.35	50	Pass
$25 (1.25/B)^{1/2}$	1.394	23.67	35	Pass
Mode 2				
$50 (1.25/B)^{1/2}$	1.410	47.08	50	Pass
$25 (1.25/B)^{1/2}$	1.410	23.54	35	Pass

7.9.7. Monitoring Antenna Requirements

The monitoring system shall use the same antenna used for transmission, or an antenna that yields equivalent reception at that location.

7.9.7.1. Test Procedure Used

ANSI C63.17 paragraph 4

7.9.7.2. Test Result

The antenna of the EUT used for transmission is the same interior antenna that used for monitoring.

7.9.8. Monitoring Antenna Requirements

Devices that have a power output Lowest than the maximum permitted under the rules can increase their monitoring detection threshold by one decibel for each one decibel that the transmitter power is below the maximum permitted

7.9.8.1. Test Procedure Used

ANSI C63.17 paragraph 4

7.9.8.2. Test Result

Not apply

7.9.9. Dual Access Criteria Check Requirements

An initiating device may attempt to establish a duplex connection by monitors both its intended transmit and receive time and spectrum windows. If both the intended transmit and receive time and spectrum windows meet the access criteria, then the initiating device can initiate a transmission in the intended transmit time and spectrum window. If the power detected by the responding device can be decoded as a duplex connection signal from the initiating device, then the responding device may immediately begin transmitting on the receive time and spectrum window monitored by the initiating device.

7.9.9.1. Test Procedure Used

ANSI C63.17, Clause 8.3.1 & 8.3.2

7.9.9.2. Test Result

EUT that do NOT implements the LIC procedure:

Test ref. to ANSI C63.17 clause 8.3.1	Observation	Verdict
b) EUT is restricted to a single carrier $f1$ for TDMA systems. The Test is Pass if EUT can transmit	EUT can transmit	Pass
c) d) Interference at level $T_L + U_M$ on all timeslots except one receive slot where interference is at least 10 dB below T_L	No connection possible	N/A
e) f) Interference at level $T_L + U_M$ on all timeslots except one transmit slot where interference is at least 10 dB below T_L	No connection possible	N/A

EUTs that implements the LIC procedure:

Test ref. to ANSI C63.17 clause 8.3.1	Observation	Verdict
b) EUT is restricted to a single carrier $f1$ for TDMA systems. The Test is Pass if EUT can transmit	EUT can transmit	Pass
c) d) Transmission on interference-free receive time/spectrum window	Connected on the target Rx window and its duplex mate.	Pass
e) f) Transmission on interference-free transmit time/spectrum window	Connected on the target Tx window and its duplex mate.	Pass

7.9.10. Alternative monitoring interval for co-located devices Requirements

An initiating device that is prevented from monitoring during its intended transmit window due to monitoring system blocking from the transmissions of a co-located (within one meter) transmitter of the same system, may monitor the portions of the time and spectrum windows in which they intend to receive over a period of at least 10 milliseconds. The monitored time and spectrum window must total at least 50 percent of the 10 millisecond frame interval and the monitored spectrum must be within 1.25 MHz of the center frequency of channel(s) already occupied by that device or co-located co-operating devices. If the access criteria is met for the intended receive time and spectrum window under the above conditions, then transmission in the intended transmit window by the initiating device may commence.

7.9.10.1. Test Procedure Used

ANSI C63.17, Clause 8.4

7.9.10.2. Test Result

The manufacturer declares that this provision is not utilized by the EUT.

7.9.11. Frame Repetition Stability and Period and Jitter

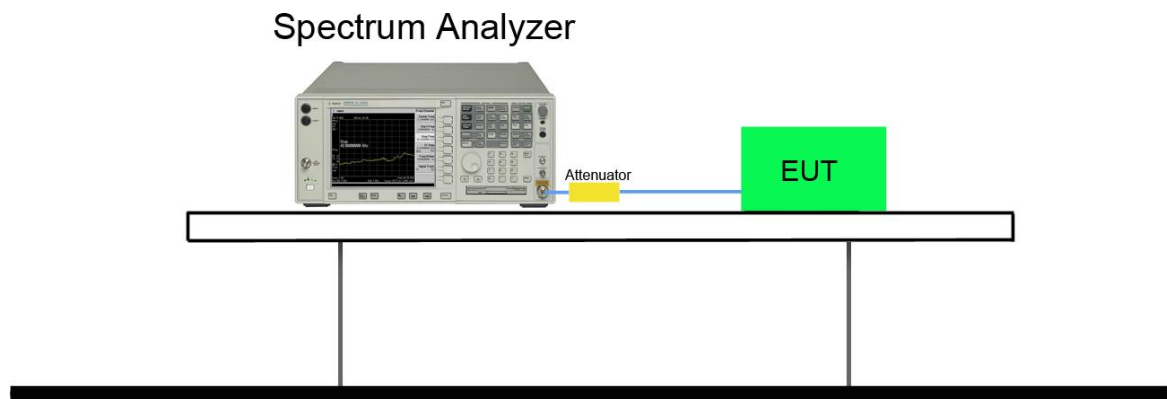
7.9.11.1. Test Limit

The frame period (a set of consecutive time slots in which the position of each time slot can be identified by reference to a synchronizing source) of an intentional radiator operating in this band shall be 20 milliseconds or 10 milliseconds/X where X is a positive whole number. Each device that implements time division for the purposes of maintaining a duplex connection on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 50 parts per million (ppm). Each device which further divides access in time in order to support multiple communication links on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 10 ppm. The jitter (time-related, abrupt, spurious variations in the duration of the frame interval) introduced at the two ends of such a communication link shall not exceed 25 microseconds for any two consecutive transmissions. Transmissions shall be continuous in every time and spectrum window during the frame period defined for the device.

7.9.11.2. Test Procedure Used

ANSI C63.17, Clause 6.2.2 & 6.2.3

7.9.11.3. Test Setup



7.9.12. Test Result

Carrier Frequency (MHz)	Frame Jitter (us)					Limit of Δ
	min	mean	max	Δ min	Δ max	
1924.992	-0.65	0	0.81	-0.65	0.81	± 25

8. CONCLUSION

The data collected relate only the item(s) tested and show that the **HD IP Conference Phone FCC ID: T2C-DD10** is in compliance with Part 15C of the FCC Rules & IC Rules.

The End